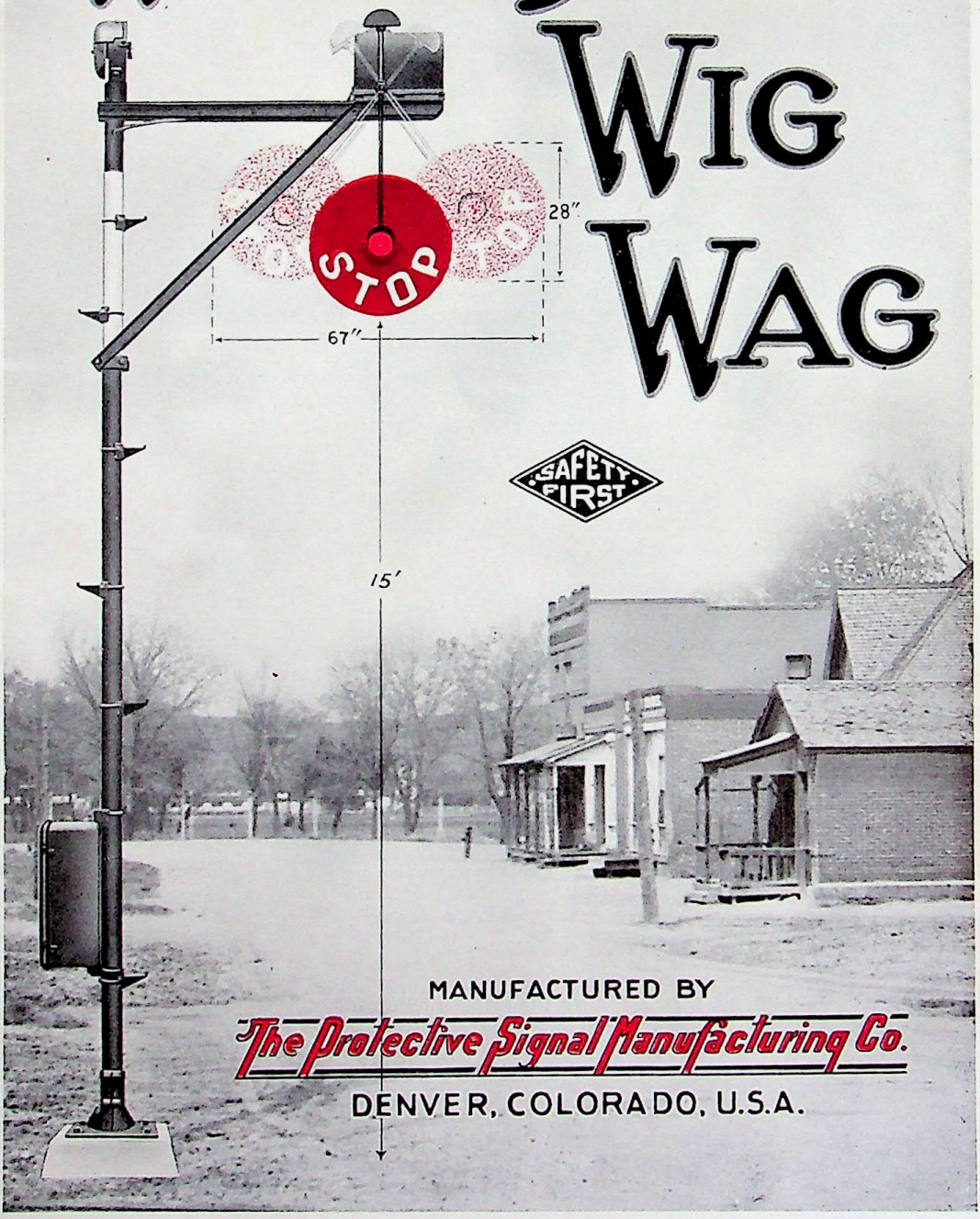
# The NATIONAL WORM DRIVE WIG WAG




MANUFACTURED BY

**The Protective Signal Manufacturing Co.**

DENVER, COLORADO, U.S.A.

## INTRODUCTION

THE National Worm Drive Wig Wag herein described is primarily the invention of railroad engineers who saw the need of such a device for the protection of grade crossings and fully realized that it must be constructed from the very best of materials, economical, absolutely positive, and simple to maintain.

One of the first models of this machine was placed on a break-down comparative test with a number of other similar devices. This test was conducted under the supervision of the signal departments of two of the largest railroad systems of the country. The results proved conclusively that this device was the most positive and reliable of its kind on the market.

That it lived up to its reputation was indicated last year at the Panama-Pacific Exposition in San Francisco, where it was awarded a silver medal, the highest award for a crossing signal.

Since acquiring this device we have incorporated improvements which have gone far toward maintaining its superior position in the signal field.

If interested in crossing signals, and if you are looking for the best the market affords, it will pay you to read the following pages.

*The Protective Signal Manufacturing Co.*

DENVER, COLORADO

## DESCRIPTION

THE National Worm Drive Wig Wag, when used in conjunction with our Model E bell and oscillator control, comprises the most effectual warning signal for grade crossings on the market.

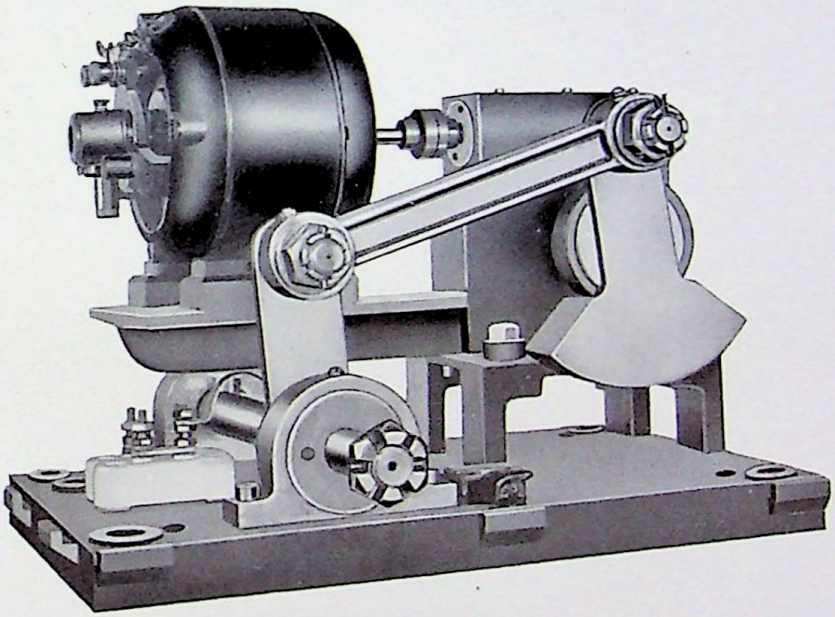


Fig. 1. Operating Unit.

In the manufacture of this device only the very best of materials are used. All bearings are of the ball and roller type. By employing the ball and roller bearings, friction and lubrication are reduced to a minimum.

Figure 1 shows the operating unit of this signal and its simple and rugged construction. The mechanism is operated by a small, well constructed, standard speed motor which is connected direct to the worm.

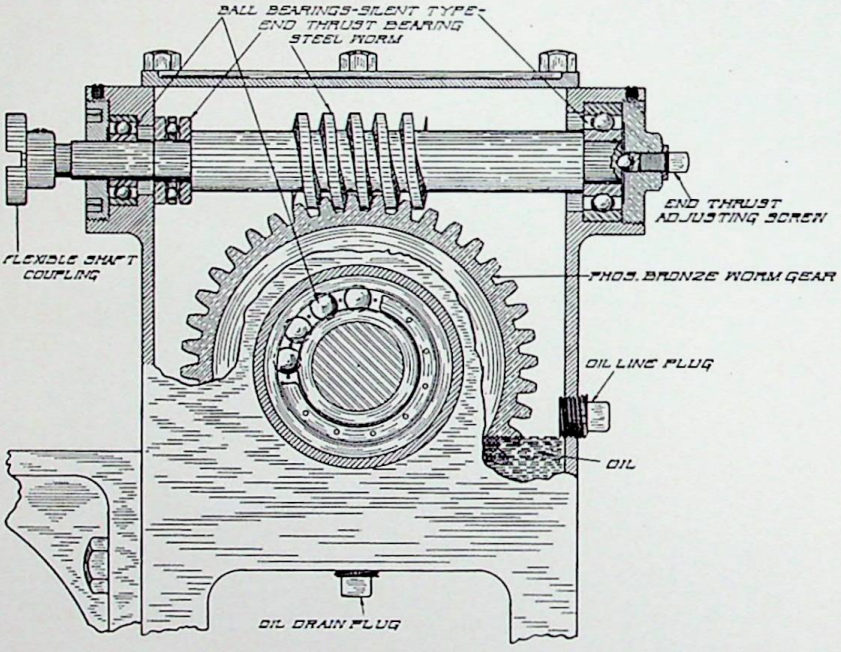



Fig. 2. Worm and Gear.

The worm and gear of the unit are enclosed in a cast iron casing, as shown by Figure 2. It is self lubricating and requires practically no maintenance.

A worm driven mechanism is conceded by all mechanical engineers to be the most positive in its operation. Owing to the fact that the reduction in speed is direct and that the worm and gear can be immersed in oil, this method of construction is considered superior to a reduction by gears which would require a number of independent bearings and increase the cost for maintenance.

The worm and gear are so constructed as to eliminate, to the very greatest extent, all lost motion.

An adjustment screw, as shown in Figure 2, is provided to take up any wear which may occur in the worm or gear.

The motors for the operation of this mechanism, where alternating current is used, are 1/10 H. P., 1150 RPM, giving sufficient power to carry several times the weight of the aspect, so that wind storms, snow or sleet have no effect upon it. A. C. motors at any standard cycle can be furnished.

A 40 to 1 reduction operates the disc or aspect to and fro at the rate of approximately thirty times per minute.

Standard signal motors are used for the operation of this wig wag on direct current.

The housing casing for the gear and worm is provided with an outlet for draining, as well as an opening at the oil level so that the proper amount of oil can be gauged.

This housing is also provided with a cover held in place by six screws which can be easily removed to permit inspection.

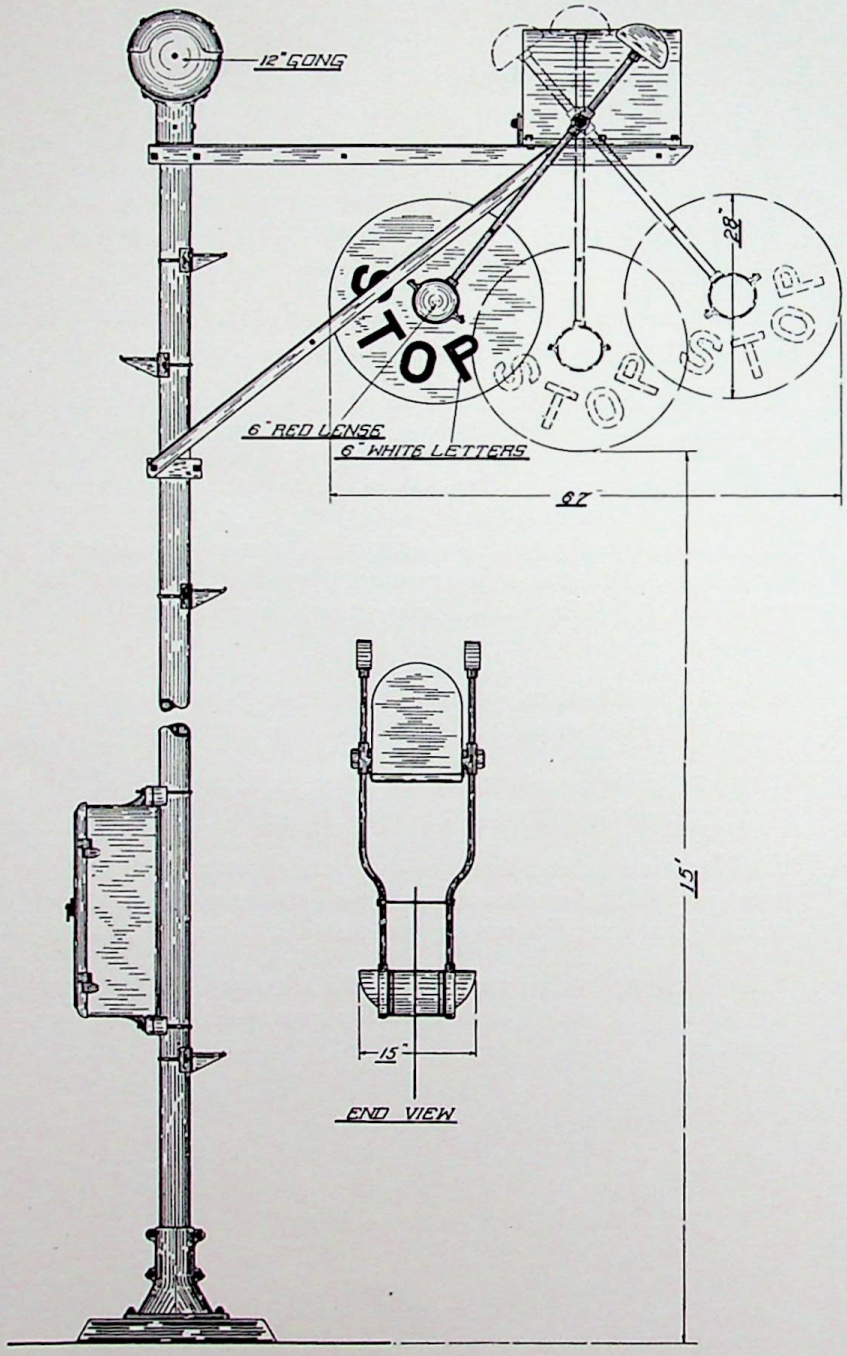



Fig. 3. Wig Wag and Bell Assembly.

The aspect of this wig wag is composed of a large disc, 28 inches in diameter, enameled bright red with the word "stop" in 6-inch white letters stenciled directly below a 6-inch red signal lens, as shown by Figure 3.

The red disc or ball is considered a universal danger signal and is recommended by the American Safety Congress as the most effectual design for a wig wag or moving danger indication.

When the signal is operated the disc is moved to and fro across the roadway, displaying a red illuminated signal lens which, with the loud ringing, 12-inch bell, gives a very effective warning of approaching danger.

Standard 6-inch red signal lenses are used.

Standard Mazda lamps illuminate the lenses when the signal is in operation and these lenses being hooded are plainly visible a distance of 1,500 feet or more in bright sunlight. At night they can be seen for a distance of two miles.

The lamps and lenses are mounted in a suitable casing and the lamps can be renewed by removing one or both of the lenses from this casing, which is provided with a wire clip for this purpose.

As shown in Figure 3, the swinging radius of the disc is 67 inches, giving a 42-inch swing to the illuminated lenses, which is approximately the same indication as that given by a watchman or flagman swinging a red lantern from a platform above the roadway.

Fig. 4. Typical Installation at West Florida Street, Denver, on D. & R. G. Ry.

The distance from the street or road level to the bottom of the disc is 15 feet, which allows ample room for any traffic to pass beneath it.

Owing to its elevation above the roadway and the distance that this aspect can be seen, ample time is afforded automobile drivers to bring their cars under safe control before reaching the crossing. The swinging red disc, illuminated lenses, and the loud ringing of the bell will compel their attention and cause them to STOP, LOOK and LISTEN before attempting to cross the tracks.

The wig wag mechanism carrying the aspect may be installed on cantilever brackets extending over the roadway 6 or 8 feet from the signal mast, as shown in Figure 3, or mounted on top of signal mast in the center of the street as shown in the cut on the back cover of this bulletin.

A warning signal of this character and design has the advantage over crossing gates, flagmen, etc., inasmuch as it is operated automatically and gives both an audible, moving and illuminated warning both day and night, regardless of weather conditions.

After each operation, and when in "clear" position, the disc of the wig wag is drawn back against the signal mast. This is the only motor operated wig wag which governs the position of the disc when not in operation, and it is also the only worm driven wig wag on the market.

All the operating mechanism is completely enclosed by a pressed steel cover, making it absolutely weather and dust proof and accessible for inspection.

All electrical connections are made on the interior of the housing casing and direct to RSA binding posts.

The wig wag, as well as our other devices, is adaptable to any voltage, either A. C. or D. C. It is an independent unit and can be operated from track circuits or any other method of control.

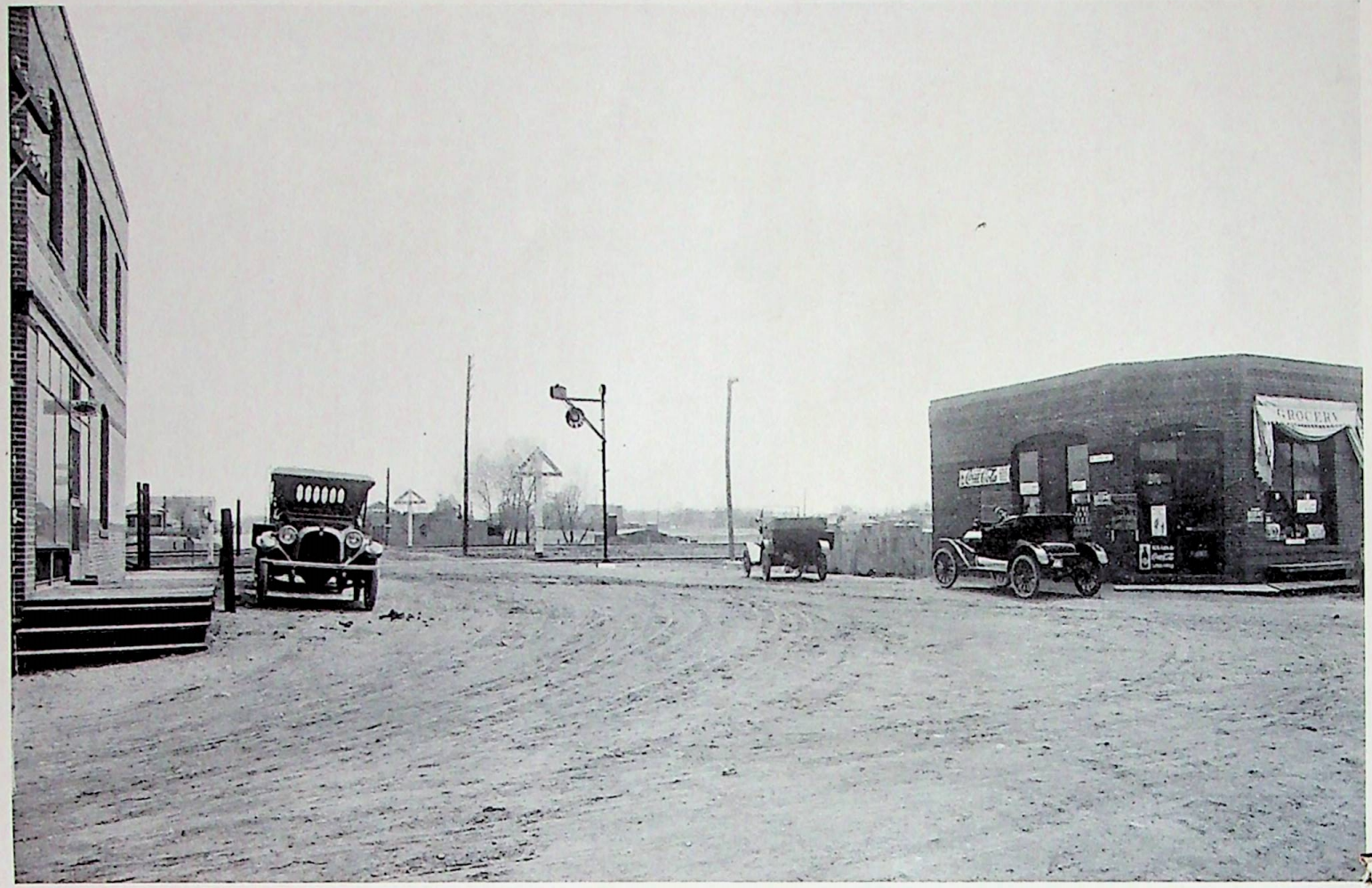



Fig. 5. Typical Installation on D. & R. G. Ry., Denver.

By means of the oscillator control, Figure 6, the signal is only operated when there is a movement on the tracks within the danger zone and it is cut out the moment the first trucks of a moving train reach the crossing.

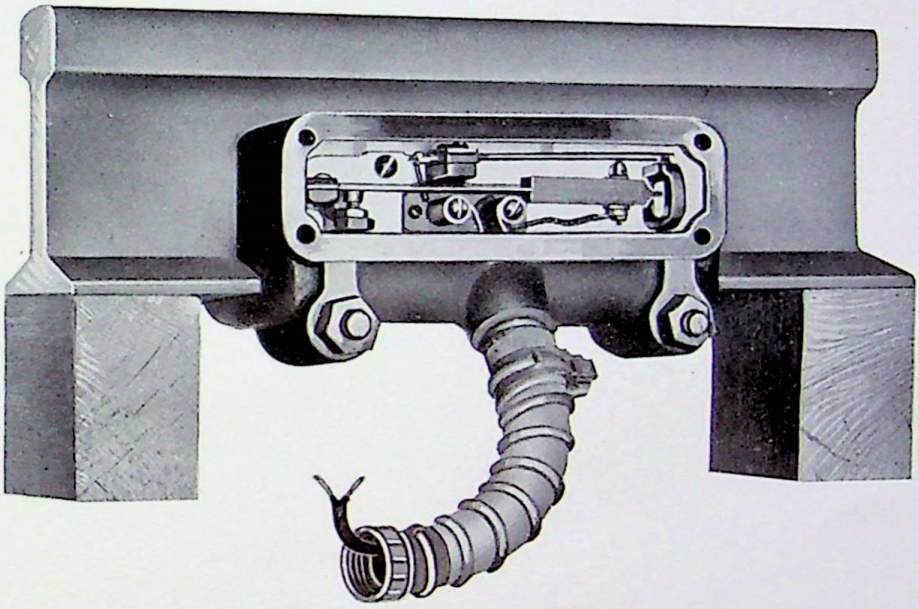


Fig. 6. Model C Oscillator.

The oscillator eliminates entirely the ringing of the bell or the operation of the signal when trains are standing at the station or cars are left standing on side tracks. Warning is only given when necessary, that is, when moving trains are within the danger zone.

Fig. 7. Installation at West Mexico Street, Denver.

Our complete crossing signal system, including the National Worm Drive Wig Wag, consists of our Model E Bell, Figure 8; our standard A. C. or D. C. Relays; our Automatic Thermo Time Units, Figure 9; our Oscillators, Figure 6;

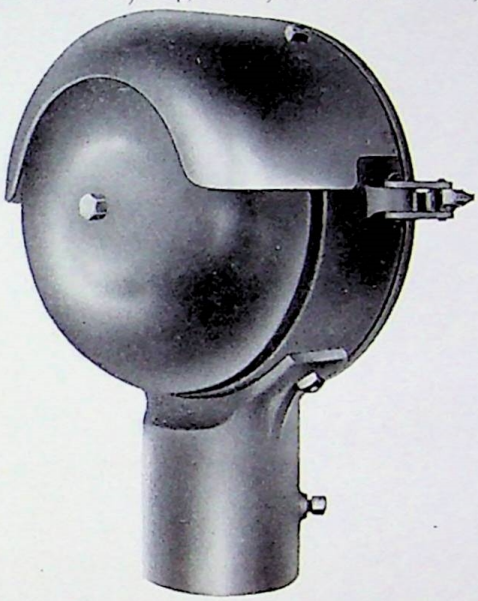


Fig. 8. Model E Bell Complete.

and our signal mast and relay box, Figure 3. The Model E Bell, where brackets are used for the wig wag, is usually installed on top of the signal mast. If desired this bell can be mounted on the side of the mast by the use of a goose-neck bracket.

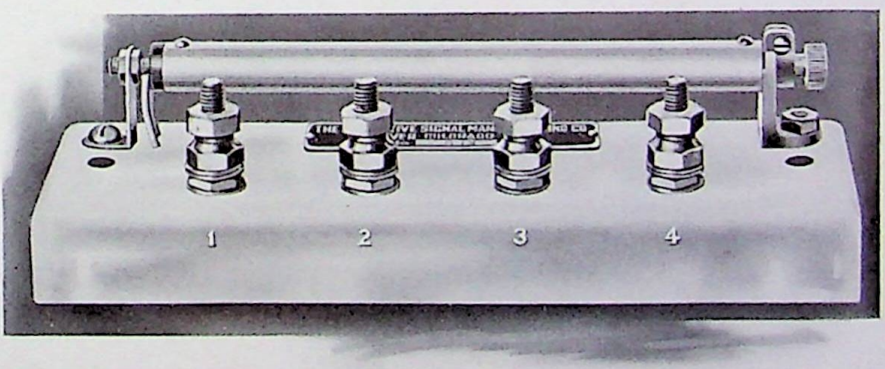
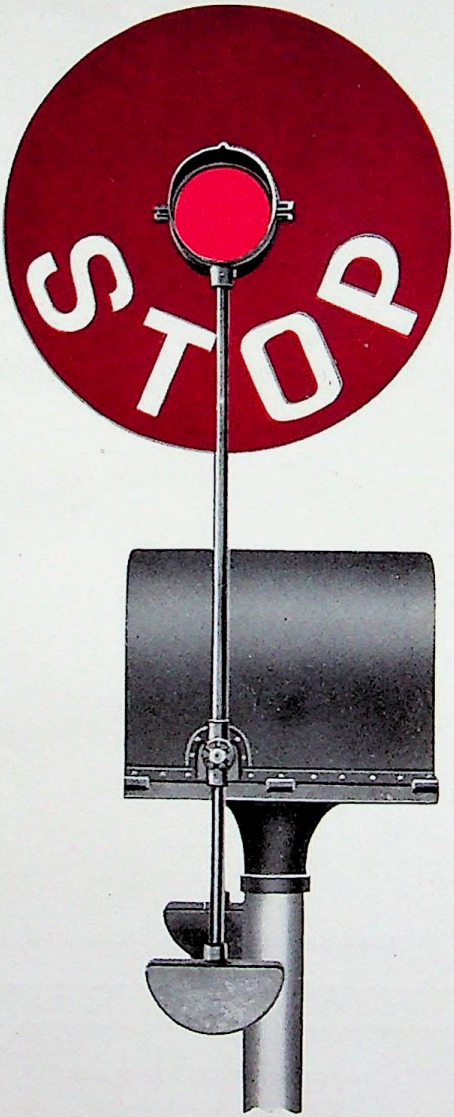



Fig. 9. The Automatic Thermo Time Unit.

The Relays and Automatic Thermo Time Units, as well as lightning arresters and terminals, are installed in the relay box.




THE W. F. ROBINSON CO., DENVER.